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ABSTRACT

A study measured both short- and long-term effects of an educational workshop designed for teachers in the Faculty of Health Sciences, Ben-Gurion, Israel. Participants were 60 volunteer faculty members who were randomly assigned to one of eight multidisciplinary groups for the 4-day workshop, which aimed at improving teachers' instructional behavior in two dimensions: (1) to replace the traditional teaching modality of lecturing by a pattern which elicits students' self-initiated verbalization (activity dimension); and (2) to use and stimulate the students to use a higher cognitive level of verbal exchange during the lesson (cognitive dimension). The workshop was based on microteaching techniques, and each teacher had 3 presentations in 3 successive days and was invlolved in reviewing approximately 18 additional presentations by colleagues. Group discussion followed each presentation as did observation of the videotaped performance by the presentor. After the workshop, 161 lessons of the 60 teachers were observed along 500 days. Results indicated an increase in both the activity and the cognitive parameter. The new level of performance was sustained for the activity parameter along the entire follow up period. And, although the cognitive level moderately declined after 200 days, the instructional behavior was still significantly different after 500 days. (JM)

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SHORT AND LONG TERM EFFECTS OF

TEACHER-TRAINING WORKSHOP IN MEDICAL SCHOOL

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ABSTRACT

The effect of a teacher-training workshop in a medical school was studied. The change in instructional behavior was judged by the amount and kind of students' verbal activities during regular lessons and by the cognitive level of the teacher-student enounters. 161 lessons of 60 teachers were observed along 500 days after the four-day workshop. The results indicate a considerable increase in both parameters following the training. The new level of performance was sustained for the activity parameter along the entire follow-up period. The cognitive level moderately declined after about 200 days. After 500 days the instructional behavior still was significantly different from that before the workshop. The implications for teacher-training and reinforcement interventions are discussed.

Teacher-training workshops are the most frequently used method for faculty development in higher education. In spite of some doubts as to its possible effects, the training workshop is still the foremost recommended tool (Wagner, 1973; Guilbert, 1977; Bland, 1980). However, the impact of the training upon actual teaching is not always quantitatively assessed, and the duration for which this effect is sustained was seldom measured (Gall et al., 1967). It is also unknown to what extent both the magnitude and the duration of the training effect depend upon the content of the workshop, the training methods used, the participants' variability or the assessment procedures. Consequently, no knowledgable decisions can be taken as to the optimal time for reinforcements, although such "booster" interventions are generally recommended (Bland, 1980; Foley & Smilansky, 1980).

Several reasons may account for the absence of sufficient research data on the efficacy of teacher-training workshops. The most important among these is the lack of clear objectives of teacher-training which, in turn, stems from deficient criteria for good teaching. If the workshop does not focus upon clearly defined behavioral objectives, the assessment of its consequences becomes a tedious effort of a questionable validity. Unfortunately, some training workshops are either all-embracing, dealing with the entire scope of teaching-learning processes or else, too cognitive-oriented, providing conceptual information yet not sufficient skill practicing. Another explanation for the rarity of such longitudinal studies is the large numbers of intervening variables arising during the follow-up period. These may include personal attributes, such as a change in teacher's status, seniority, educational experience and teaching responsibilities. They may

also include process variables, such as modifications in class-size, teaching-learning methods and curriculum. Also differences between student cohorts may have a notable effect. Not all these variables can, of course, be effectively controlled.

The present study aims at measuring both short and long term effects of an educational workshop designed for teachers in the Faculty of Health Sciences, Ben-Gurion University, Israel (BGU). The training intended to orient the focus of instruction toward the student by enhancing learner initiated high order cognitive activity. Transfer of the responsibility for learning process and product from the teacher to the students has long been recommended and generally accepted (Flanders, 1970). Higher cognitive level of the verbal exchange during any educational encounter reflects the attempt to develop problem-solving skills rather than passive acceptance of factual knowledge (Hunkins, 1972; Aschner, 1961). High learners' activity and higher order cognition correspond with BGU's institutional philosophy and objectives (Segall et al., 1979). Both are operationally defined and can be achieved by a common training method. Further, both can be applied to any instructional style, any size of learning group and any discipline; indeed, to any profession and almost to all educational levels.

METHOD

The participants in the training workshop were sixty volunteer faculty members, representing 24 disciplines, encompassing clinical, basic and behavioral sciences. They were teaching medical students in all the segments of the BGU six-year curriculum, using a variety of instructional methods ranging from lecturing to small group discussions to bed-side teaching. Their courses varied in both duration and intensity. Faculty also differ from each other by personal background variables such as age, sex, level of

professional experience, seniority and instructional proficiency.

Each teacher was randomly assigned to one of eight multidisciplinary groups and took part in a four-day workshop which aimed at improving teachers' instructional behavior in two dimensions: (a) To replace the traditional teaching modality of lecturing by a pattern which elicits students' self-initiated verbalization (activity dimension); and (b) to both use and stimulate the students to use a higher cognitive level of verbal exchanges during the lesson (cognitive dimension). The workshop was based on micro-teaching techniques (Allen & Ryan, 1969). Each teacher had three micro presentations in three successive days and was involved in reviewing about 18 additional presentations of his or her colleagues. The content of the 15-minute micropresentations was derived from the field of expertise of the presenter, and was usually a segment of an actual lesson. The level of simulation was further hightened due to the fact that the presenter was the only expert in his or her field in the group. The participants were thus really learning while acting as students. Each presentation was followed by a group discussion, in which the participants provided feedback to the presenter. Following this, the presenter had an opportunity to observe his or her own videotaped performance of both same and previous days in privacy and discuss it with a tutor on a one-to-one basis.

The first day of the workshop was entirely dedicated to extensive practice in identification of the cognitive level of given questions and statements as well as training in their reformulation in order to raise their cognitive level. Determining the cognitive level also constituted part of both groups and individual review of the presentations.

The criteria for assessing the activity dimension were (a) the lesson time used by the teacher vs. that used by students, (b) the initiator of

the observed activity (teacher, student); and (c) the kind of the observed activity (question, response to a question, self-initiated presentation, etc.). The criterion for assessing the cognitive dimension was Bloom's taxonomic scale for cognitive domain (Bloom et al., 1956) The two facets of criteria and their hierarchical relationship are presented in Table 1. Both dimensions were quantified using the Technion Diagnostic System (TDS), which is a direct observational system (Perlberg et al., 1974; Bar-On & Levin, 1974), based on Guttman's Facet Approach (Guttman, 1954), yet capable of assessing each of its dimensions separately. The assessment is based on rating three five-minute segments of videotaped lesson at 3 seconds intervals by two trained raters simultaneously, each rating one of the two assessed parameters, namely activity and cognitive level. Their training included about 7 hours of practicing during three sessions at which point interrater reliability of .90 was achieved on each of the two dimensions. Only then was each rater assigned to rate one dimension. Their ratings yielded two scores for each educational encounter ("a lesson"), ranging from 100 points (lowest, reflecting "teacher talking all the time" or "all talking is on a knowledge level") to 600 points (highest, corresponding to "students initiate verbalization during the entire lesson" or "all talking is on an evaluation level").

Table 1 about here

Three lessons given by each participating teacher prior to the workshop, all of them within his or her regular curricular activities, were videotaped and assessed. In order to use the mean TDS scores of these lessons as a base line, the reliability of the scores was first established by both inter-lesson correlations and a two-way fixed model analysis of variance. The former

indicated correlations between .42 and .56 for all possible pairs of lessons ($p<.001$). The later analysis revealed no significant mean differences between the three lessons ($F=2.50$). It was thus possible to establish a base line for the pre-workshop performance.

Three additional lessons, also within the teacher's routine responsibilities, were videotaped and similarly assessed after the workshop. The time intervals between the workshops and the first observed lesson as well as between the three observations, were determined exclusively by curricular considerations. An attempt was made to start the observations as soon after the training as possible and to prolong it for as long as possible. This was not always feasible because of constraints imposed by the actual curriculum. Thus, an haphazard distribution of the observed lessons emerged. The follow up period was arbitrarily divided into 90-day segments, roughly representing semesters, starting at the end of the workshop. The unbalanced distribution might have caused all the three lessons of a certain teacher to coincide within one or two 90-day segments, while some other teachers might have been observed along the entire period. It thus should be noted that the observed unit is a lesson rather than a teacher. The distribution of lessons between the five 90-day time-units is presented in Table 2.

RESULTS

Although the TDS has been long used in Israel for both training and assessing teachers, it was felt necessary to re-examine its reliability in the given context. For this purpose all lessons given by a teacher within a period of five days or less were considered as test-retest cases. Twenty-four such lessons, given by 12 teachers were identified among the 161 observed

lessons. The correlations between the TDS scores of these 12 pairs were .70 and .76 for the activity and cognitive levels respectively ($p < .01$). It may be noted that the 12 pairs were drawn from all 90-day time units, provided that the interval between them did not exceed five days. The stability of the pre-workshop observations, described above, serves as additional confirmation of the reliability of the instrument.

The effect of the intervention was evidenced by a conspicuous rise in both activity and cognitive levels observed following the training workshop as compared to the pre-workshop performance, as may be noted in Table 2 and figures 1 and 2. Using a fixed-effects ANOVA procedure this rise was found to be statistically significant for the activity ($F=44.10$, $p<.001$) and cognitive ($F=11.58$, $p < .001$) parameters. The fixed-effects model of analysis was prefered over the repeated-measures one because the compared observations were lessons rather than teachers, as was noted above, and the lessons within each 90-day time-unit were given by a somewhat different teacher population.

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table 2 about here

In order to evaluate whether or not the workshop effects were sustained over the 500 days of the observations, a regression analysis was performed for each dimension. It is shown that no significant regression slope across time was found for the activity parameter ($F=.77$, $p < .60$; figure 1), indicating sustainance of the newly acquired performance level. However, the cognitive parameter did show a moderate significant regression slope. In order to identify the point at which the effect began to diminish a similar regression analysis of cognitive scores against time was performed for the first two and then three and four 90-day time-units. It was found

that the cognitive level was sustained almost unchanged during the first three 90-day periods (table 2, figure 2), and the regressions slope for this period was non significant (F=1.79). All the decline was confined to the 270-500 day period, for which, in turn, another regression analysis against time was performed. By extrapolation it is possible to suggest the 190-200th day after the intervention as the point in time in which the decline in performance starts (figure 2). As the suggested procedure is not refined enough to identify the exact point of change in slope, it may be enough to suggest that the decline in cognitive level parameter starts within the 180-270 day period.

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figures 1 & 2 about here

In order to further detect possible significant differences between groups additional analyses of variance were performed. Three groups were defined according to the sequence of the lessons of each teacher: first group was all the lessons observed first, then all the lessons observed second and finally those monitored third, disregarding the point in time these lessons were actually given. However, only lessons included in the first 270 days were considered for the cognitive parameter. These analyses revealed no significant mean differences between groups (F=.70 and .004) for activity and cognitive parameters, respectively.

Finally, t-tests were performed to determine whether or not scores after 500 days were still higher than the pre-workshop base line scores. The results indicate that in spite of the decline in teachers' performance it is still significantly higher at the 500th day after the intervention than before ($p < .001$ and $p < .05$ for activity and cognitive parameters respectively).

DISCUSSION

The results suggest that the four-day educational workshops indeed significantly changed the instructional behavior of the teachers. After the workshop teachers tended to stimulate and encourage students' verbal activity more, as compared with their pre-workshop performance, and thus to spend less time lecturing. They also acquired the skill both to use and to stimulate higher cognitive levels of verbal activities than were used before.

The results further suggest that the training effect was sustained over long periods of time. Sustainance of the newly achieved activity level was demonstrated for a period which is equivalent to two academic years, hinting to the possibility that a new instructional pattern has been established. It may even be the case that a new perception of the teacher's own role took place: Instead of being solely a transmitter of factual knowledge, the teacher becomes also a solicitor, stimulator, leader of a discussion, or a resource person, which means a reverse flow of information from the learners to both teachers and peers.

The rise in the cognitive level following the training was not as prominent nor as prolonged as was the increase in the activity level. Nevertheless, a significant and quite meaningful improvement was noted during the first period of about an academic year duration. The difference in the workshop effect on the two dimensions may be attributed to the greater difficulty in changing deeply rooted cognitive patterns than changing classroom behaviors. Cognition is an intellectual capacity and thus an internal factor. Verbal activity, on the other hand, is a skill, and thus an external factor. In addition it may be noted that the activity level depends to a greater extent upon the teacher, while cognitive level requires

students' cooperation. It is expected that students will raise the cognitive level of their reasoning if the teacher would do so (Winne, 1979). This transfer is, however, difficult. Still, another explanation should be considered; that is that teachers acted for the camera. Such an act is far easier for the activity than the cognitive dimension. However, an analysis of the results for various time segments along each lesson (Mahler & Benor, 1983) and observational impressions do not support this argument. It seems that "camera awareness" fades out within 5 to 15 minutes after the commencement of the lesson, and plays no role in the recorded effect (Irwin & Perrott, 1981).

The results do not indicate whether or not teachers reached their utmost potential following the workshop, and thus cannot address the question as to whether a reinforcement training may further improve their performance. The decline in the cognitive level which starts after more than 200 days suggests that a reinforcement at this point may be beneficial. It well may be the case that the sustained activity level will further rise following such a reinforcemnt. However, earlier supplementary training is not felt to be needed.

The described teacher training workshop aimed at specific operationally defined goals. It is thus impossible to generalize over other teacher-training experiences, and to establish a prefered time for supplementary training. However, on the lines of the presented results one may wish to follow up the effects of any teacher training experience for a much longer period of time than researched before, using various research designs. Such follow ups may throw additional light on the question of the most effective modes of teacher-training and preferable time for

reinforcement. The results presented here, however, point in favor of the intensive workshop format so frequently used and so often criticized.

Finally, both background variables concerning variability among teachers, and process variables which might have arisen during the follow up period, did not mask the workshop effect. While these variables were not specifically studies herein, it should be stated that no change occurred either in the curriculum or in any educational approach and method either around or after the workshop. A study which will measure the direction and magnitude of the effect of these intervening variables may throw additional light on the issue.

A word of caution is felt necessary. The great within-groups variance indicated by the large standard deviations make it impossible to predict the effect of the training on an individual teacher. It is probably the case that some teachers do not gain anything from the training; that others do, yet fast extinction occurs; that still others are slow learners, improving as the time goes on, and finally that some do manage to permanently change their instructional behavior. Nevertheless, the presented results describe reality over individual differences. This reality is the most important parameter on the institutional level. In other words-- following a workshop the instruction improved for a long period of time in spite of possibly both individual differences and fluctuations.

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REFERENCES

Allen D.W. and Ryan K. (1969): Microteaching. Addison-Wasley, Palo-Alto, CA.

Asenner M.J. (1961): Asking Questions to Trigger Thinking. NEA Journal, 50: 44-56.

Bar-On E. and Levin R. (1974): The Use of Computers in Evaluating Teacher Competency. A paper presented at the annual meeting of the American Educational Research Association, Chicago.

Bland C.J. (1980): Faculty Development Through Workshops. C.C. Thomas Publ., Springfield, IL.

Bloom B.S., Engelhart M.D., Hill W.H., Frust E.J. and Krathwohl D.R. (1956): Taxonomy of Educational Objectives. David McKay Inc., NY.

Flanders N.A. (1970): Analyzing Teacher Behavior. Addison-Wesley, Reading, MA.

Foley R.P. and Smilansky J. (1980): Teaching Techniques: A Handbook for Health Professionals. McGraw-Hill Inc., NY.

Gall M.D., Dunning B. & Weathersby R. (1967): Higher Cognitive Questioning: Minicourse 9, McMillan Educational Services, Inc.

Guilbert J.J. (1977): Educational Handbook for Health Personnel. World Health Organization, Geneva.

Guttman L. (1954): A New Approach to Factor Analysis: The Radex.in: Paul F. Lazarsfeld (Ed.): Mathematical Thinking in the Social Sciences. Free Press, Glencoe, IL.

Hunkins, P.P. (1972): Questioning Strategies and Techniques. Allyn S. Bacon Inc.

Irwin W.G. and Perrott J.S. (1981): Systematic Use of Closed-Circuit Television in a General Practice Teaching Unit. Journal of Royal College of General Practioners 31: 557-560.

Mahler S. and Benor D.E. (1983): Changes in the Rhythm of Lessons Following a Teacher-Training Workshop in Medical School. A paper presented at Bat-Sheva Seminar for Science Teaching, Jerusalem (submitted for publication).

Perlberg A., Bar-On E., Levin R., Bar-Yam M., Lewy A. and Etrog A. (1974): Modification of Teacher Behavior Through the Combined Use of Micro-teaching Techniques with the Technion Diagnostic System (TDS). International Science, 3: 177-200.

Segall A., Prywes M., Benor D.E. and Suskind O. (1979): University Centre for Health Sciences, Ben-Gurion University of the Negev, Beer-Sheva, Israel: An Interim Report. in: F.M.Katz and T. Fulop (Eds.): Personnel for Health Care: Case Studies of Educational Programmes. Public Health Papers 70, World Health Organization, Geneva.

Wagner A.C. (1973): Changing Teachers' Behavior. A Comparison of Micro-teaching and Cognitive Discrimination Training. Journal of Educational Psychology 64: 299-305.

Winne P.H. (1979): Experiments Relating Teachers' Use of Higher Cognitive Questions to Student Achievement. Review of Educational Research 49: 13-50.

Table 1

Criteria for Scoring Activity and Cognitive Levels*

Score		Activity Level		Cognitive Level
Low	a_1	Teacher lectures	b_1	knowledge
	a_2	Teacher questions	b_2	comprehension
	a_3	Teacher responds, reacts	b_3	application
	a_4	Student answers, responds	b_4	analysis
	a_5	Student asks, questions	b_5	synthesis
High	a_6	Student initiates	b_6	evaluation

* Adopted from the Technion Diagnostic System (Perlberg. et al., 1974).

Table 2: Scores of Activity and Cognitive Levels Before and After the Workshop (mean and standard deviation)

Period	N of Lessons	Activity Level		Cognitive Level	
		mean	standard deviation	mean	standard deviation
Pre-Workshop	180	169.80	70.3	167.00	76.0
Post Workshop					
1-90 days	23	231.38	79.3	207.49	73.5
91-180 days	46	229.26	79.8	206.07	64.1
181-270 days	37	233.23	97.7	207.36	88.4
271-360 days	37	204.60	67.7	174.37	67.6
361-500 days	18	233.39	119.9	177.33	46.1
Mean Post Workshop	161	218.10	78.9	185.70	60.8

Figure 1: Distribution and Regression Line of Activity Level Scores Over Time

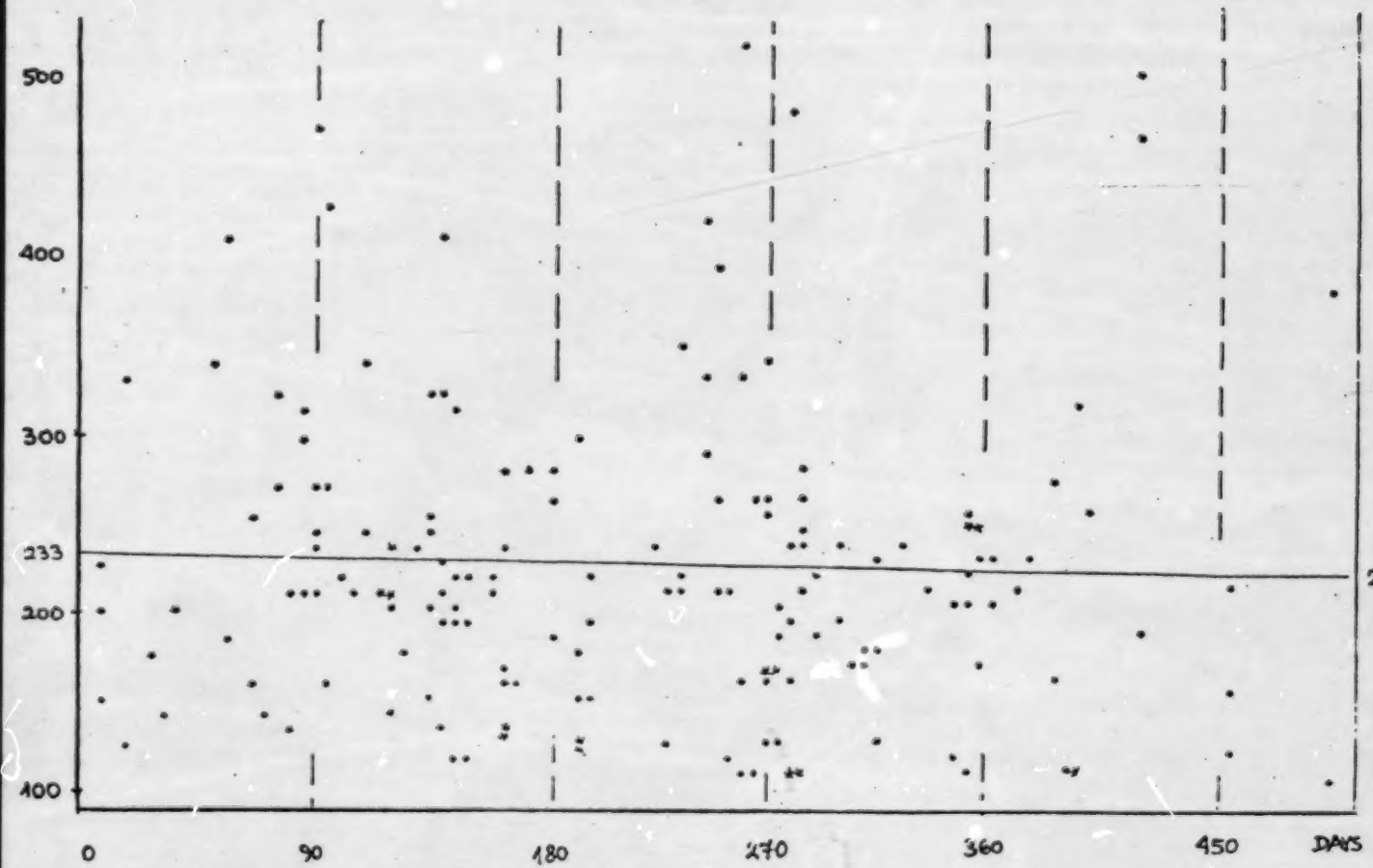

Figure 2: Distribution and Regression Line of Cognitive Level Scores Over Time